LPR 1710.10

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Langley Research Center

LANGLEY RESEARCH CENTER ENERGY CONTROL PROGRAM (LOCKOUT/TAGOUT)

National Aeronautics and Space Administration

Responsible Office: Safety and Mission Assurance Office

PREFACE

P.1 PURPOSE

a. This Langley Research Center Procedural Requirements (LPR) establishes a Lockout/Tagout (LOTO) program for controlling hazardous energy sources where the unexpected start up or release of stored energy could cause injury to employees or damage to equipment. This LPR is a part of the LaRC safety program and is intended to assist supervisors and employees with their individual responsibility for safety.

P.2 APPLICABILITY

a. This program is applicable to all persons including all contractors at Langley Research Center (LaRC) performing maintenance, repair or servicing activities as covered in the Occupational Safety and Health Administration (OSHA) standards 29 CFR 1910.147, 29 CFR 1910.333(b)(2), and 29 CFR 1910.269 (d).

(1). **Servicing and/or maintenance.** Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the **unexpected** energization or startup of the equipment or release of hazardous energy.

b. Noncompliance with the requirement of this LPR may result in appropriate disciplinary action against civil service employees or sanctions against contractors in accordance with the terms of their contracts.

P.3 AUTHORITY

a. NPR 8715.3, “NASA General Safety Program Requirements.”

P.4 APPLICABLE DOCUMENTS

a. Occupational Safety and Health Administration (OSHA) regulations, 29 CFR 1910, “Occupational Safety and Health Standards”
b. NASA Langley Procedural Requirement LPR 1710.6, “Electrical Safety”
c. Langley Form (LF) 287, “Lockout/Tagout Procedures/Records Inspections”
d. LF 383, “Red Lock/Red Tag” (RL/RT)
e. LF 403, “Craft Specific (CS) Authorization Card”
f. LF 416, “LaRC Energized Electrical Work Permit”
g. LF 425, “Shop Machine (SM) Authorization Card”
h. LF 451, "Safety Operator Appointment Form"
i. LF 453, "NASA Langley Safety Operator's Permit"
j. LF 493, "Lockout/Tagout Release"
k. LF 495, "Energy Control Procedure"

l. LF 496, "Lockout/Tagout Records"
m. LF 519, "Safety Operator Field Verifier Appointment Form"

P.5 MEASUREMENT/VERIFICATION

None

P.6 CANCELLATION

LPR 1710.10, dated January 14, 2005, is rescinded and should be destroyed.

Original signed on file

Steve G, Jurczyk
Deputy Director

Distribution is limited to NASA Langley Research Center Employees, Civil Servants and Contractors

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Chapter 1

1. INTRODUCTION

1.1 SCOPE

1.1.1 The potential for energy related injury or property damage when servicing machines, equipment or systems at LaRC is ever present. The degree of risk is directly related to the work to be performed and the complexity of the controls required. Compliance with the requirements of this LPR will provide adequate protection; however, these procedures only provide a minimum standard. Responsible employees should always strive to improve upon this standard by assessing risk on a continuous basis.

1.2 APPLICATION

1.2.1 The requirements of this “Energy Control Program” are applicable anytime the unexpected release of hazardous energy may result in injury to personnel or damage to property during servicing or maintenance activities.

1.2.2 These requirements do **not** apply to:

a. An “Administrative” control, see LPR 1740.2 ”Facility Safety Requirements” examples include:
   (1) A locked fence around high-voltage switching station to prevent unauthorized access.
   (2) A lock on an overhead crane disconnect switch. (to prevent unauthorized operation).
   (3) A locked door to a laser or chemical laboratory station to prevent unauthorized access.
   (4) Locked equipment that is out of use for an indefinite period of time.
   (5) A locked facility or a system that is deactivated or mothballed.

   (Note: Locks used in the Administrative applications above shall not be the same type used for this LOTO Program.)

b. Work during normal operation of a machine, equipment or system unless a person is required to remove or bypass installed guards or safety devices or required to place any part of his or her body in the danger zone or point of operation of any machine or equipment that may exist during the normal operating a cycle. In such cases, controls must be provided to ensure the safety of exposed personnel to a level consistent with this LPR. (See 29 CFR1910.147(a)(2)(ii))

c. Work on energy generating facilities or the transmission and distribution lines and equipment for electricity, natural gas, liquid nitrogen, water, steam or any other

energy that is under the **exclusive** control of the respective commercial utility owner.

d. Work on “cord and plug connected”” electrical equipment where the hazard of the unexpected energization or startup is controlled by removing the plug from the energy source and by the plug remaining in the exclusive control of the employee performing the maintenance, repair or servicing activity. (**Note**: exclusive control only applies to plug and cord connected equipment and means the plug is within arm’s reach and sight of the employee performing the servicing and maintenance activity).

e. Energized electrical work where de-energizing equipment introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. The limitations include:
   (1) Life support equipment
   (2) Testing of circuits that can only be performed while the circuit is energized
   (3) Work on circuits that form an integral part of a continuous process that otherwise needs to be completely shut down to work on one circuit This exception requires issuance of a LF 416, “LaRC Energized Electrical Work Permit” in accordance with LPR 1710.6, “Electrical Safety Program”

f. New Construction Activities with special approval – In special circumstances the Safety and Facility Assurance Branch (SFAB), with the concurrence of the appropriate Standard Practice Engineer, may allow the use of the Contractors LOTO process in lieu of LPR 1710.10. It is always preferred to use LPR 1710.10 and this special approval is intended for situations under the contractors’ control (before delivery to the government) during the commissioning or start-up phase. The request shall be submitted to SFAB from the Civil Servant responsible for the Contract. Approval from the SFAB Manager will be granted on a case-by-case basis if the Contractor’s LOTO process meets minimum 29 CFR 1910.147, LOTO requirements and after considering issues such as:
   (1) Well defined physical and functional boundary between existing Center operations and or facilities (control of energy sources between existing LaRC facilities and the new facility under construction).
   (2) Personnel that are best qualified to understand and control the energy at the new facility during the construction project.

1.3 REQUIREMENT

1.3.1 This LPR establishes compliance with Lockout/Tagout requirements of 29 CFR 1910.147, "The Control of Hazardous Energy (Lockout/Tagout)," Paragraph 333 (b) (2) of 29 CFR 1210.331 – 335 Electrical “Safety-Related Work Practices”, and Paragraph (d) of 29 CFR 1910.269, “Electric Power Generation, Transmission and Distribution” and NPR 8715.3C “NASA General Safety Program Requirements.”

1.4. WAIVERS

1.4.1 Request for waivers to any of the requirements in this LPR shall be submitted to SFAB in writing and processed in accordance with LMS-CP-7151, “Obtaining Waivers for Langley Management System (LMS) Requirements.”

Chapter 2

2. GENERAL POLICY

2.1 INTRODUCTION

2.1.1 At LaRC the majority of the energy isolation devices are electrical switches or mechanical shut off valves. It is rare to find an energy source that cannot be isolated and locked and for this reason, the LaRC policy is to lock and tag an isolation device. If an isolation device cannot be locked, then a tag with alternative means of control as described in 29 CFR 1910.147 (c)(3)(ii), must be approved by SFAB. There are other forms of energy that should be considered, and the following is a limited list that does not include all possible energy sources and hazards:

a. The energy associated with large springs, lifting devices, rotating parts, or large roll-up garage doors.
b. Corrosive chemicals.
c. Toxic chemicals/materials.
d. Asphyxiates – oxygen deficiencies.
e. Materials/compounds/equipment that burn (temperature exceeds150° F.).
f. Cryogenic liquids/systems.
g. Hydraulic/pneumatic or similar systems that may need to be controlled by unique devices.
h. Injuries caused from sudden pressurization/depressurization.
i. Electrical

2.2 LOCKING and TAGGING (LOTO)

2.2.1 Anytime an employee performs maintenance, repair or service tasks on machines, equipment or systems where the unexpected energizing, startup, or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative by locking the appropriate energy-isolating device(s). Specific procedures are contained in Chapter 3 of this LPR.

2.2.2 *At LaRC only Safety Operators (SO) or shop machine operators are authorized to lockout machines, equipment or systems. The SO shall determine the hazards, energy sources, and the energy isolation devices (such as valves or switches) that need to be operated to provide a safe environment. The SO shall make the determination, in conjunction with other knowledgeable and experienced personnel, by review of drawings, piping and instrumentation documentation, specifications, or other means and by a physical inspection of the machine, equipment or system.*

2.2.3 If an SO has insufficient knowledge or experience with the system they have been asked to lockout, the SO has the authority and responsibility to disqualify themselves from performing the LOTO.

2.3 TAGOUT WITHOUT LOCKING

2.3.1 If an energy isolating device is not capable of being locked, it shall be the responsibility of the applicable organization, with the approval of LaRC Safety Manager or his/her designee, to implement alternative procedures and controls that meet the requirements of 29 CFR 1910.147(c)(2), (c)(7)(ii) and (d)(4).

2.4 LOTO METHODS

2.3.1 The three lockout methods approved for use at LaRC are:

a. Red Lock/Red Tag (RL/RT) – this requires using the red identification tag, LF 383, with the red lock.
b. Craft Specific (CS) – this requires using the blue identification card, LF 403, with the red lock.
c. Shop Machine (SM) – this requires using the yellow identification card, LF 425, with the red lock.

2.4.2 The following apply to the use of these three methods:

a. The RL/RT method is acceptable for locking out any machine, equipment or system. The lockout shall be performed by an authorized SO and documented on LF 496 “LOTO Records”, which is a register used to establish the status, isolation, procedure, responsible employees and other useful information about a lockout. See Section 3.5.2 for details.
   (1) A RL/RT lockout is identifiable by the red identification tag affixed to the lockout device with the red lock.

b. The CS method is acceptable for servicing and maintenance activities, such as building HVAC or electrical work that can be completed in one work shift. It shall only be used if:
   (1) **All of the exception elements** of paragraph 2.5.1 of this LPR are met.
   (2) The employee(s) applying the lockout is an authorized Craft Specific Safety Operator (CSSO) and the only employee(s) performing the servicing or maintenance. See Section 3.3 for procedures.
   (3) The CS lockout is identifiable by the CSSO Blue identification card, LF 403, affixed to the lockout device with the red lock.

c. The SM method shall only be used when locking out permanently installed shop machines if:
   (1) **All of the exception elements** of paragraph 2.5.1 of this LPR are met.
   (2) The employee(s) applying the lockout is an authorized Shop Machine Operator (SMO) and the only employee(s) servicing the machine. See Section 3.4 for details.
   (3) The shop machine has a LOTO procedure posted on or near the machine.
   (4) The SM lockout is identifiable by the SMO Yellow identification card, LF 425, affixed to the lockout device with the red lock.

2.5 ENERGY CONTROL PROCEDURE EXCEPTION

2.5.1 The RL/RT method requires that a written procedure for each lockout event be documented on LF 495 per Section 3.5.1 of this LPR unless **all of the following elements exist**:

a. **The machine or equipment does not operate at a potential exceeding 600 volts**.

b. **The machine or equipment has no potential for stored or residual energy** (or re-accumulation of stored energy after shut down).

c. **The machine or equipment has a single energy source**, which can be readily identified and isolated.

d. The isolation and lockout of that energy source will **completely deenergize and deactivate** the machine or equipment.

e. An electrical isolation device must be locked out by an electrical SO, not by a mechanical SO authorized to perform electrical lockouts for non-electrical work.

f. The machine or equipment is **isolated from that energy source and locked out** during maintenance, repair or service.

g. **A single lockout device** will achieve a locked-out condition.

h. **The lockout device is under the exclusive control** of the employee performing the work. (The employee working under the LOTO must be the one to apply the LOTO device to the energy isolation device.)

i. The work does not create hazards for other employees.

j. The organization and/or SO utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine, equipment or system during maintenance, repair or servicing.

2.6 DEVICE/HARDWARE STANDARD

2.6.1 In accordance with 29 CFR 1910.147(c) (5), the locking hardware (e.g., locks, identification tags, isolation control devices) shall be durable, standardized, substantially constructed and readily identifiable and shall not be used for any other purpose. For this reason, the SFAB shall either purchase or approve the purchase of all lockout hardware. The identification tags will normally be attached through the eye of the tag and the lock shank. The locks and identification tags used at LaRC shall meet the following:

a. RL/RT method
   (1) Red Lock
   (2) Red Identification Tag

b. CS method
   (1) Red Lock
   (2) Blue Identification Card, LF 403

c. SM method
   (1) Red Lock
   (2) Yellow Identification Card, LF 425

2.7 RESPONSIBILITIES

2.7.1 SAFETY AND FACILITY ASSURANCE BRANCH (SFAB) shall:

a. Develop and maintain the procedural requirements of this LPR.

b. Conduct periodic inspections of lockout records, using LF 287, to ensure the "Energy Control Procedures and Associated Documents Record of Inspection", LF 495, are reviewed, at least annually, in accordance with 29 CFR 1910.147 (c)(6).

c. Procure and/or approve purchases of all lockout hardware.

d. Provide annual LOTO training relating to this LPR.

e. Assure all new equipment installed or major repair, renovations or modifications after January 2, 1990 is capable of being locked out. (See 29 CFR 1910.147(2)(2)(iii)).

2.7.2 ORGANIZATIONAL UNIT MANAGERS (OUMs) shall:

a. Provide employees the opportunity to attend training related to this LPR.

b. Investigate any violations of this LPR and implement corrective and disciplinary action as appropriate.

2.7.3 SUPERVISORS shall:

a. Become familiar with this LPR and how it affects their organization.

b. Initiate requests for SO and Field Verifier (see paragraph 5.4) appointments associated with this LPR.

c. Provide for and document technical training related to the machine, system and energy sources that are requested to be locked out.

d. Periodically, at least annually, inspect (and maintain a record of the inspection, using LF 287) the Energy Control Procedures and Associated Documents Record of Inspection, LF 495, and associated documents.

e. Attend required annual supervisors refresher training.

2.7.4 FACILITY COORDINATORS (FC) for industrial facilities and SUPERVISORS responsible for maintaining/repairing institutional services, such as air conditioning/heating and electrical, may requisition LOTO hardware, locks and red identification tags from SFAB. These FCs, and supervisors shall:

a. Control the requisitioned hardware, locks and identification tags and designate an area where employees have access to lockboxes and lockout documentation during a lockout.
b. Maintain the lockout documentation during and after a lockout has occurred.
c. Understand the equipment in their facilities and how lockouts affect other occupants so that they may communicate warnings as appropriate (see section 2.8 COMMUNICATIONS).
d. Assure that the Energy Control Procedure, LF 495, is prepared, approved by the SO's and verified by the protected employees and that information is inputted into LF 496, "Lockout/Tagout Records".
e. Be responsible for communicating with all employees in the area and those employees involved with the lockout.
f. Attend required annual LOTO training.
g. Ensure records/documentation is independently (an inspection by a knowledgeable person other that the SO that applied the LOTO) inspected at least annually.

2.7.5 LaRC DUTY OFFICER shall:

a. Maintain lockout hardware and LF 496, "Lockout/Tagout Records," for use after hours and for facilities that do not maintain hardware and record forms.

b. In an emergency, have the authority to apply an administrative lock to safe the system/equipment. Before repair maintenance can begin the system/equipment must be locked and tagged by a SO.

c. Notify the appropriate FC of any lock placed in their facility after normal duty hours. This will normally be done at the beginning of the next duty day.

d. Attend annual LOTO training.

2.7.6 FACILITY SAFETY HEAD shall:

a. Become familiar with this LPR and how it affects their organization/facility.

b. Attend annual LOTO training.

2.7.7 SAFETY OPERATORS (SO) shall:

a. Possess a current permit, and have it on-hand or readily accessible, as proof of their authorization, while performing lockouts.

b. Lockout equipment or systems in accordance with the requirements of this LPR.

c. Fully understand hazardous energy associated with the equipment and systems they are authorized to lockout.

d. Meet the SO's qualification requirements from Section 4.3 of this LPR.

e. Disqualify themselves from performing the LOTO if they feel they lack the knowledge or experience to safely lock out a system. SO's have the authority and responsibility to do so.

f. Attend required LOTO training.

g. Re-apply for certification every 4 years.

h. When requested participate in the inspection of a lockout performed by another SO.

i. Approve the Energy Control Procedure, LF 495, relating to the locking and tagging of equipment or systems they are authorized to lockout.

j. Document pertinent information onto the Red Identification Tag and LF 496.

k. Issue the red identification tag stub with the key, to the RE after:
   (1) Providing the RE instructions/training: about the hazards, controls and any other safety concerns associated with the lockout and the process for removing the locked out condition
   (2) Allowing the RE to verify that the isolation and de-energization has been accomplished.

l. Communicate with other employees involved with lockout about the hazards, controls and any other safety concerns that may affect them.

2.7.7.1 Special Instructions for Electrical Safety Operators

a. Verification
   (1) When verifying electrical isolation, the SO shall place the electrical disconnect switch that isolates the electrical power from the desired circuit, in the open position and observe that an air gap exists between the line and load contacts of the switch.
   (2) If the required air gap between the line and load contacts of the switch cannot be observed, the SO shall first start the facility, equipment, system, or apparatus, in a normal or manual operating mode, and then de-energize by opening the breaker or disconnect switch that supplies electrical power. The SO shall perform appropriate measurements to verify electrical isolation.
   (3) On manually controlled equipment, the qualified SO shall start the facility, equipment, system, or apparatus, open either the disconnect switch or

branch circuit breaker, and verify shut down. The SO shall use test equipment to perform appropriate measurements to verify that the energy source has been isolated from the facility, equipment, system, or apparatus.

(4) When the facility, equipment, system, or apparatus, has malfunctioned and cannot be restarted, the SO shall open either the disconnect device or circuit breaker that feeds the facility, equipment, system, or apparatus, and use test equipment to perform appropriate measurements to verify that the energy source has been isolated from the equipment.

b. When applying a LOTO to electrical circuits/devices, the SO shall comply with safety clearance procedures delineated in LPR 1710.6, "Electrical Safety."

2.7.7.2 Special instructions for Mechanical Safety Operators

a. Before starting to work under a mechanical or fluid systems LOTO, the apparatus, valves, or systems shall be secured in a safe condition with appropriate vents, pins, or other devices, as follows:
   (1) Pressurized or vacuum systems shall be properly vented to completely relieve any differential pressure.
   (2) Isolation supply valve(s) shall be locked and tagged in the closed position. Vent valve(s) shall be locked and tagged according to the specific LOTO procedure, LF 495.
   (3) Where dangerous gas or liquid systems are involved or in areas where the environment may be oxygen deficient, systems or areas shall be purged, adequately ventilated, or otherwise made safe.
   (4) The SO and the RE/protected person shall assure that the venting system shall remain intact so that pressure cannot build up in the system during progress of the work.
      a) LaRC preferred method of safing a pressure system is to implement a double block and bleed. If this cannot be accomplished a safety assessment shall be approved by the Safety Engineer.
   (5) The SO shall ensure that hazardous material is not vented into the environment.

b. LOTO of Electrical Isolation Devices
   (1) Mechanical SO’s may apply and be certified to place a lockout device and a red tag, LF 383, on electrical isolation devices, in accordance with an established procedure, LF 495, for the purpose of performing non-electrical type work on electrical systems, mechanical systems, fluid systems, equipment, or apparatus, if all of the following are true:
      a) The equipment operates at less than 600 volts.
      b) There is an approved “Energy Control Procedure”, LF 495, for the specific non-electrical type work to be performed and it specifies that the LOTO of the electrical isolation device may be performed by a mechanical SO.
      c) The isolation device(s) controlling the power to the equipment are easily correlated and clearly marked.

c. It is the responsibility of the SO to know the limits of his/her LO/TO authority.

2.7.8 RESPONSIBLE EMPLOYEE shall:

a. Assume overall responsibility for a LOTO lockout when two or more employees are performing a lockout activity.

b. Have complete knowledge of the Energy Control Procedure, LF 495, being implemented.

c. Have their name registered in the “Lockout/Tagout Record,” LF 496 and on both parts of the Red Identification Tag.

d. Be knowledgeable of the roles of the SO(s) applying the lockout.

e. Accept the red identification tag stub with the key from the Safety Operator after reviewing the Energy Control Procedure, LF 495, verifying that the isolation and de-energization has been accomplished and after receiving instructions/training from the SO about the hazards, controls and any other safety concerns associated with the lockout including the requirement removing the lockout.

f. Place the red identification tag stub with the key in the lock box and lock it with his/her personal lock.

g. Know the location, assignments and exposure status of all the Protected Employees (PE) for whom responsibility has been assumed. For large groups this will require maintaining a list of the PE(s), their work location and status of their personal locks.

h. Communicate with the SO(s), FCs, to ensure that their roles and responsibilities for this lockout are understood.

i. Ensure the PE(s) has received instruction/training about the Energy Control Procedure, LF 495, and this LPR (Program) as it pertains to their personal safety and protection.

j. Ensure the PE(s) are given the opportunity to verify that isolation and de-energization has been accomplished.

2.7.9 PROTECTED EMPLOYEE shall:

a. Meet the applicable requirements of the RE when he/she is the only employee that is being protected under the lockout procedure.

b. Receive instructions/training from the SO or RE about the Lockout process, the PE’s responsibilities, the hazard controls and any other safety concerns associated with the lockout before beginning work.

c. Ensure that his/her personal lock is in place on the lock box before commencing work.

d. Verify that all hazardous energy has been isolated and controlled.

e. Ensure that his/her personal lock remains in place until protection is no longer required.

2.7.10 SHOP MACHINE OPERATORS shall:

a. Possess a current yellow authorization card, LF 425, issued by SFAB.

b. Only protect themselves under the locked out condition.

c. Ensure the shop machine has LOTO procedures posted on or near the shop machine.

d. Ensure the posted procedures have been reviewed and signed within a year of the current lockout.

e. Locks out the machine following the posted procedures and secures the energy control device with a RED lock.

f. Attach their yellow identification card, LF 425, to the RED lock.

g. Securely maintain the key to the RED lock in their possession.

h. Communicate with other (affected) employees in the area about the hazards and any other safety concerns related to the lockout.

2.8 COMMUNICATIONS

2.8.1 Whether implementing the RL/RT, CS or SM lockout method, the employees involved with the lockout shall initiate discussions and continue to communicate as described below, and as necessary until the lockout condition is lifted. As a minimum, the following communication protocol shall take place:

a. Discussion between the FC or their designee and the SO(s) shall take place prior to initiating the lockout. The FC is expected to be familiar with their facility and may be able to provide additional insight to ensure no additional hazards are created because of the lockout.

b. To promote a safe working environment during lockout it is necessary that the FC and SO understand each other's responsibilities and necessary interactions with the RE/PE.

c. The SOs and FCs shall also warn other employees (*affected employees*) that work in the area but are not directly involved with the lockout about any hazards that exist because of the lockout.

d. Immediate notification to the FC or their designee of any problems that arise during the lockout that will affect operations within the facility.

e. Final communication between the FC or their designee and the SO(s) prior to removing the LOTO.

f. Warning from the FC or designee to all the employees in the area prior to re-energizing the system.

g. Status briefing to the incoming RE and crew when shift work is involved. Shift work may also involve changes in the status of affected employees and may require that additional warnings be made. The FC or RE will determine the need and implement the warnings.

h. Communications in the form of a training briefing shall be provided to the RE and PE(s) from the SO or their designee. The training briefing shall be specific to the hazards and controls for the lockout they will be working under. See Section 3.2.1(i).

2.9 TRAINING REQUIREMENTS

a. All LaRC employees and contractors shall receive the appropriate training and retraining in the “Energy Control Program”, LPR 1710.10. The training content and frequency is determined by the employee’s Lockout/Tagout responsibilities.

2.9.1 All Center employees receive yearly safety awareness training. A portion of that training covers the basic do’s and don’ts of LOTO. It presents the message of when should a machine, equipment or system be locked out, by whom, and what an individual should be aware of if he/she come across a lockout.

2.9.2 Construction and maintenance contractors and their subs receive a safety briefing before they are allowed to work on Center. The briefing is good for six months and a portion of the briefing delivers the following LOTO message:

a. When a lockout should be applied.

b. Only LaRC’s program is applicable on Center, (Exception see 1.2.b (7).

c. Only a LaRC authorized SO can perform and release a lockout (Exception see 1.2.b (7).

d. Individuals that need LOTO protection will require additional training specific to the LOTO they will be working under.

2.9.3 PEs – In addition to either the yearly safety awareness training or the sub-contractor training, Protected Employees must receive instructions/training specific to the LOTO they will be working under. The training will address their responsibilities; see section 2.7.9 of this LPR.

2.9.4 The SOs, FSHs, SMOs and FCs must take yearly LOTO training that cover the requirements of this LPR.

2.9.5 SOs – LaRC's "Energy Control Program," LPR 1710.10, relies on the SOs to identify and control hazardous energy and thus provide protection to employees working under a lockout. For this reason the SO's training requirements are the most demanding. In addition to the yearly training described above in section 2.9.4 above, the SOs shall:

a. Meet the minimum training and or experience requirements specified in section 4.3 of this LPR.

b. Demonstrate competency in accordance with this LPR by passing a written test administered by the SFAB.

c. Demonstrate through field verification the ability to implement the requirements of this LPR, identify hazardous energy sources, isolate and de-energize machines, equipment or systems from those energy sources.

Chapter 3

3. APPLICATION OF PROGRAM CONTROLS

3.1 INTRODUCTION

3.1.1 Standardization of how energy sources are controlled will provide a safer work environment. The following controls, when applied, will reduce energy related risks to an acceptable level at LaRC. Before applying the controls in this chapter one must first determine which method of lockout applies to the work being performed (see paragraph 2.4 of this LPR).

3.2 RED LOCK/RED TAG (RL/RT) LOCKOUT CONTROLS

3.2.1 Placing the LOTO

a. **ENERGY CONTROL PROCEDURE** - If any one of the elements of paragraph 2.5.1 of this LPR cannot be met an Energy Control Procedure, LF 495, (see paragraph 3.5.1 of this LPR) shall be developed and approved by the SO(s) participating in the lockout and another employee acceptable to the SO as being knowledgeable of the system being locked-out and concurred with by the FC or their designee.

b. **COMMUNICATIONS** - The SO shall initiate discussions with the FC or their designee (see paragraph 2.8 of this LPR).

c. **CONTROLING THE ENERGY** - The SO isolates energy sources; releases stored energy (if any) and installs locks and identification tags. See paragraph 3.5.3 for more information on tags.

d. **VERIFICATION** - Before giving the red identification tag stub with the key to the RE the SO verifies that isolation and de-energization of the machine/equipment or system has been accomplished in accordance with the specific LOTO procedure, LF 495. Another employee acceptable to the SO as being knowledgeable of the system being locked-out shall verify the LOTO when, in the opinion of the SO it is a complex system or for any electrical system operating above 600 volts.

e. **COMMUNICATION & TRAINING** -The SO gives the red identification tag stub with the key to the RE and provides the RE instructions/training about the hazards, controls and any other safety concerns associated with the lockout, the requirement for removing the lockout and allows the RE to verify that the isolation and de-energization has been accomplished

f. **PERSONAL PROTECTION** - The REs shall lock the red identification tag stub with the key in a lock box with their personal lock.

g. **DOCUMENT** - The SO or the FC shall enter the required information on LOTO Records, LF 496. See Paragraph 3.5.2 for more information on this form.

h. **COMMUNICATION TO AFFECTED PERSONNEL** The SO or their designee (the FC or RE) shall notify personnel in the vicinity of the lockout that a lockout is in progress.

i. **PERSONAL PROTECTION, COMMUNICATION & TRAINING** - The SO or RE shall provide a training briefing to PE prior to commencing work. The briefing shall include as a minimum:
   (1) Information about the energy source(s) and the associated hazard(s), the control(s), the location of the controls, and the person that locked-out the isolation control device.
   (2) Information about who is leading (RE) the lockout, who they shall notify with concerns and who they shall notify when they have finished the task and no longer require protection.
   (3) An opportunity to understand and clarify any questions about the Energy Control Procedure, LF 495, and verify that the isolation and de-energization of the machine/equipment and or system have been accomplished.
   (4) The guidance that the PE is required to lock their personal lock on the lockbox and return it to the RE only after they no longer require protection.

3.2.2 REMOVING THE LOTO

a. **WORKSITE VERIFICATION** - After the PE complete their tasks and the RE has inspected the work area to verify that system components have been properly reassembled, the PEs can remove their personal lock from the lock box.

b. **REMOVAL OF PERSONAL LOCKS** - The last personal lock to be removed shall be the RE's. The RE shall take the red tag, LF 383, stub from the lock box and return it to the FC or SO.

c. **WORKSITE VERIFICATION** - The FC or their designee along with the RE shall verify that the system has been properly reassembled, the servicing work is completed and employees no longer need lockout protection.

d. **COMMUNICATION TO AFFECTED PERSONNEL** - The SO or their designee (the FC or RE) shall notify personnel in the vicinity of the lockout that the lockout is being lifted.

e. **VERIFICATION** - Before lifting the lockout the SO shall reunite the red identification tag stub with the key with the corresponding red identification tag on the energy control device to make sure that the lockout is being lifted on the correct energy control device.

f. **COMMUNICATION** - The SO shall remove the lockout hardware and notify the FC that the system is no longer under lockout.

g. **DOCUMENT** - The SO or the FC shall document the lockout release in the LOTO Records, LF 496.

3.2.3 TESTING OR POSITIONING

a. In situations that require removal of the lockout device from the isolating device and the machine/equipment or system energized to test or position the machine, the sequence of actions shall be documented and approved using LF 495, Energy Control Procedure. The following sequence of events shall be documented and followed:
   (1) Release from Lockout as stated above in section 3.2.2.
   (2) Energize and proceed with testing or positioning.
   (3) De-energize the system and reapply energy control measures, in accordance with the RL/RT lockout controls specified above in section 3.2.1.

3.2.4 MULTIPLE SHIFT LOCKOUTS

a. Personal locks may, with agreement from the RE, be left on the lockbox. PE must verify that their lock is still on the lock box prior to starting work on subsequent shifts.

b. The Personal lock of the RE shall remain locked on the lockbox until the work is completed and they are ready to reunite the red identification tag stub with the key with the tag on the energy control device.

c. The crew leader for the out-going shift shall communicate with the on-coming shift to verify the current lockout condition.

d. The RE shall ensure that the PE(s) from the oncoming shift have received PE(s) instruction/training about the Energy Control Procedure, LF 495, and this LPR (Program) as it pertains to their personal safety and protection.

e. The RE shall ensure that the PE from the oncoming shifts are given the opportunity to verify that isolation and de-energization has been accomplished.

3.3 CRAFT SPECIFIC LOCKOUT PROCEDURES

a. The Craft Specific Safety Operator (CSSO) assesses energy risks, identify hazards and determine which isolation control device requires lockout.

b. The CSSO notifies the FC or their designee of the pending lockout and discuss any issues, concerns and schedule.

c. CSSO notifies employees in the vicinity of the lockout that a lockout is in progress.

d. The CSSO shall isolate the energy source; release stored energy and install red lock and blue identification card, LF 403. Each person protected by the CS lockout shall be an authorized CSSO and shall have placed their red lock with the blue identification card, LF 403 - “CRAFT SPECIFIC AUTHORIZATION CARD”, on the lockout device.

e. CSSO's verify effectiveness of lockout by attempting to start-up the machine/equipment.

f. Once work is complete, the CSSO shall verify that the system has been properly reassembled and that it is safe to release the locked out condition.

g. The FC or their designee shall be notified that the system is being released from the locked out condition.

h. The CSSO notifies employees in the vicinity of the lockout that a restart is in progress.

i. The CSSO removes the lockout hardware and allows the system to be restarted.

j. Temporary Removal - In situations in which lockout devices shall be temporarily removed from the isolating device and the machine/equipment or system energized to test or position the machine, the following sequence of actions shall be followed by the CSSO:
   (1) Release from Lockout as stated above.
   (2) Energize and proceed with testing or positioning.
   (3) De-energize the system and reapply energy control measures per Paragraph (d) and (e) of this section.

k. The lockout applied by a CSSO(s) shall not extend beyond one work shift. If the servicing cannot be completed in one work shift then the CSSO(s) for the on-coming shift may transfer their blue identification card(s), LF 403, and lock with that of the out-going CSSO(s) or the lockout shall be transferred to the Red Lock/Red Tag method.

3.4 SHOP MACHINE LOCKOUT PROCEDURES

a. SMO assess energy sources, identify hazards, and verify/review the posted shut down and lockout procedure posted for the machine.

b. The SMO notifies employees in the vicinity of the lockout that a lockout is in progress.

c. The SMO isolates the energy source; releases stored energy and installs red locks and SMO's yellow identification card, LF 425. Each person protected by the SM lockout shall be an authorized SMO and shall have placed their red lock with yellow identification card, LF 425, on the lockout device.

d. The SMO shall verify effectiveness of lockout by attempting to start-up the machine.

e. Once work is complete, the SMO shall verify that the system has been properly reassembled and notifies employees in the vicinity of the lockout that a restart is in progress.

f. The SMO unlocks the red lock and allows the system to be restarted.

3.5 RL/RT LOTO FORMS, IDENTIFICATION TAG and HARDWARE

a. The following are associated with the RL/RT LOTO method.
   (1) LF 493, "Lockout/Tagout Release" (see 3.5.4)
   (2) LF 495, "Energy Control Procedure" (see 3.5.1)
   (3) LF 496, "Lockout/Tagout Records" (see 3.5.2)
   (4) Red Identification Tag (see 3.5.3)
   (5) The NASA Forms can be downloaded from Langley Management System web site and the Red Identification Tags may be requested from the Safety and Facility Assurance Branch Manager.

b. LOTO hardware, locks and red identification tags can be requisitioned from SFAB by FC's, his/her designee or the supervisor(s) responsible for maintaining institutional services such as air conditioning/heating and lighting. Those individuals shall control the requisitioned hardware and identification tags and designate an area where employees have access to lockboxes and the lockout documentation. All documentation relating to a specific lockout event shall be maintained for one year.

3.5.1 LF 495, ENERGY CONTROL PROCEDURE

a. The Energy Control Procedure and the red identification tag(s) shall be unique to the specific machine, piece of equipment or system and the service or maintenance being performed.

b. LF 495 shall be used to document the Energy Control Procedure. When necessary, LF 495 can reference a continuation sheet but the procedures shall clearly and specifically identify the following:
   (1) A unique identification number and date of review and approval.
   (2) The machine, piece of equipment or system along with the facility location.
   (3) The type and magnitude of the energy to which employees may potentially be exposed.
   (4) The hazard(s) associated with the energy.
   (5) The steps for shutting down or turning off the machine, equipment or system. The procedure may reference an existing Standard Operating Procedure.
   (6) The location of all energy isolation devices that are needed to control the energy shall be noted or referenced in an attached drawing/schematic. For electrical equipment/systems this includes any required safety grounds, that are needed to control the energy.
   (7) The specific sequence (if necessary) in which the control devices need to be deactivated or how they need to be operated.
   (8) Specific requirements for testing the machine/equipment or system to verify that all potentially hazardous stored or residual energy is relieved, disconnected, restrained, and otherwise rendered safe.
   (9) The specific sequence for removing control devices, (if necessary).

(10) Specific procedures to control shift or personnel changes to ensure the continuity of the lockout. If required it shall include provisions for the orderly transfer of locks between off-going and oncoming shifts.
(11) Approving officials by name are the SO(s) participating in the lockout and another employee acceptable to the SO as being knowledgeable of the system being locked-out.
(12) The FC or their designee shall concur with the procedures.

c. The lockout shall only be performed by the SO that reviewed and signed the Energy Control Procedure. The Energy Control Procedure is only valid for 1 year.

3.5.2 LF 496, LOCKOUT/TAGOUT RECORDS

a. LF 496, "Lockout/Tagout Records," shall be used as a tool by the facility as an ongoing log to indicate the active and historical lockout condition(s) in the facility. Entries recorded in the log shall be kept for a minimum of one year. This form shall be used anytime the RL/RT method is used. Information required on the Lockout Records Log is as follows:
(1) **Tag No.** - The serial number of the red identification tag issued to the SO.
(2) **Date Tag Issued** - The date the Safety Operator gave the red identification tag to the RE.
(3) **Facility Coordinator** – The FC or their designee that issues the RED identification tag to the Authorized Safety Operator.
(4) **Safety Operator** – The authorized SO locking out the system.
(5) **Responsible Employee** – The name of the employee the RED tag, LF 383, is written to. It could be a PE in the case of a single lockout or it could be the RE in the case of a group lockout.
(6) **Location of Tag** – Identify where the locked-out isolation device is located. (Note: be as specific as possible noting the location)
(7) **Personal Locks Out/In** – Number of Personal locks issued to the RE /PE.
(8) **Lock Box** – Number of the lockbox. (Lock boxes shall be identified.)
(9) **Work to be performed and the System** – Briefly describe the system and the servicing being done.
(10) **Procedure No. LF 495** - Record the procedure number (if a documented procedure is required).
(11) **Facility Coordinator** – The FC or their designee authorizing the removal of the lockout device.
(12) **Safety Operator** – The authorized SO removing the lockout device.
(13) **Date Tag lifted** – The date the lockout device is removed.

3.5.3 RED IDENTIFICATION TAGS

a. The SO shall complete the information requested on the red identification tag. The white backing on the top half of the form shall be peeled off and the protection window placed over the information to protect it from the environment. The bottom stub shall be removed at the perforation and given to the RE/PE along with the key to the red lock. Clarification of information required on the red identification tag is as follows:
(1) **Location** - Building/facility name or number.

(2) **Date** - Date when the lockout is applied.
(3) **Equipment** - Name of the machine/equipment or system being locked-out.
(4) **Tagged For:** - Who the tag is issued to.
  a) **Name** - The RE/PE or N/A if applied for yourself
  b) **Section** - Organization responsible for the lockout
  c) **Telephone** - Contact number of the RE
(5) **Time** - Time the lockout was applied.
(6) **Remarks** - Any pertinent notes.
(7) **Locked By** - SO that locked-out the isolation device.

b. The above information is repeated on the bottom half or stub section of the tag along with the name of the RE/PE accepting the stub and the date accepted.
(1) **Reported Clear** - The time and date the lock and lockout devices were removed from the energy isolation device.
(2) **Returned to Service** - N/A
(3) **Cleared By** - The SO that removed the lockout devices.

3.5.4 LF 493, LOCKOUT/TAGOUT RELEASE (Without Red Tag Stub, LF 383, or Removal of Personal Lock by authorized personnel)

a. Anytime a personal lock is removed from a lock box by someone other than the employee who applied that lock, such removal shall be done with approval documented on the LF 493. When completing the LF 493 and a worker is not available and forgot to remove their personal lock or in an emergency situation, the lock may be removed by documenting the following steps:
(1) Verify that the employee that applied the lock is not in the facility.
(2) Make every effort to contact the employee before removing the lock.
(3) Document what is being done to notify the individual (before he/she returns to area) that their lock was removed and the status of the lockout.
(4) The employees' Supervisor will approve the removal of a personal lock from the lockbox by someone other than the employee who applied the lock documenting the action on LF 493.

b. Any time a red identification tag stub is not available for the SO's verification for the release of the lockout, the release shall be documented on LF 493. The Supervisor or Facility Manager responsible for the system shall:
(1) Verify that the equipment, machine or system has been properly reassembled, the servicing work is complete and the employee(s) no longer need lockout protection.
(2) Document why the red identification tag stub is not available.

Chapter 4

4. AUTHORIZATION OF SAFETY OPERATORS AND SHOP MACHINE OPERATORS

4.1 DOCUMENTATION

a. The documents associated with the authorization of SOs, CSSOs and SMOs are:
   (1) LF 451, "Safety Operator Appointment Form"
   (2) LF 453, “Safety Operators Permit”
   (3) LF 403, “Craft Specific Blue Identification Card”
   (4) LF 425, “Shop Machine Yellow Identification Card”

4.2 AUTHORIZATION PROCESS

a. Candidates for the SO, CSSO or SMO (both civil servants and on site-contractors) shall be recommended by their supervisor by completing LF 451 and forwarding to LaRC Safety Manager.

b. The candidate shall understand the requirements of this LPR.

c. The Supervisor shall ensure the recommendation provides sufficient detail defining type of energy, the maximum energy level, the building(s)/facility(s), and the machine/equipment/or system that the employee will be authorized to lockout. Any one or a combination of the following descriptive examples could be used:
   (1) Authorized to lockout electrical energy 600 volts and above at any LaRC substation.
   (2) Authorized to lockout electrical energy below 600 volts at the National Transonic Facility.
   (3) Authorized to lockout pneumatic pressure systems up to 125 psi in building 1195.
   (4) Authorized to lockout steam pressure systems up to 350 psi in the steam generation facility.
   (5) Authorized to lockout devices controlling electrical energy that is below 600 volts to do mechanical repair, servicing, or maintenance of mechanical components/systems.
   (6) For all the energy sources associated with the laser system for the Aerospace Research Project.
   (7) For any HVAC energy control devices at LaRC limited to 220 volts and 125 psi. (**This would be for CSSO’s appointment**).
   (8) For the Cincinnati Brake machine in building 1232A. (**This would be for SO’s and SMO’s**).
   (9) Authorized to lockout electrical energy below 600 volts for mechanical work.

d. The Supervisor shall document the candidate's qualifications on LF 451 and maintain a record of the candidates training and experience with the machine, equipment or system they are seeking to obtain LOTO certification.

e. The LaRC Safety Manager shall review the candidate's qualifications and process the appointment form.

f. Employees that are recommended to receive authorization to lockout a shop machine shall:
   (1) Be recommended by their supervisor.
      a) The supervisor documents and signs LF 451, indicating that the employee is experienced with the shop machine(s) they are requesting authorization for to ensure they understand the energy source and hazard and the procedure for isolating/controlling the energy.
   (2) Present the signed application to SFAB and receive formal training and testing to:
      a) Ensures they understand their responsibility and limitations of their authorization.
      b) Ensure they understand that the machine they are requesting lockout authorization for meets all the procedural exemptions of 29 CFR 1910.147 (c)(4).
   (3) Be issued a **yellow** laminated (ID) card, LF 425, once they pass the test and their application is reviewed and approved by the Safety Manager.

g. Candidates seeking authorization for SO shall:
   (1) Meet the qualification requirements (section 4.3)
   (2) Successfully demonstrate to a Field Verifier their knowledge of both this LPR and their ability to control and lockout energy on the equipment/systems for which they are seeking authorization.
   (3) Pass a written test administered by the LaRC Safety Manager.

h. Upon satisfying Paragraph (g) above the LaRC Safety Manager shall issue a LF 453, "NASA Langley Safety Operator's Permit," that is valid for 4 years from the date on the permit.

i. The LaRC Safety Manager and Field Verifier shall ensure SO's understand that their safety and the safety of the Protected Employee's depends on their ability to lockout a system safely and they have the authority and responsibility to refuse to lockout a system if they feel they are not qualified to do so or for any reason they think their safety or the Protected Employee's safety will be compromised.

j. The LaRC Safety Manager or his/her designee shall keep LF 451, along with the results of the written test on file.

k. Employees seeking to be CSSO shall:
   (1) Be recommended by their supervisor on a LF 451.
   (2) Be an authorized SO.
   (3) Be briefed by the Safety Office about the responsibilities and limitations of a CSSO.
   (4) Be issued a **blue** laminated (ID) card, LF 403, once their application is reviewed and approved by the Safety Manager.

4.3 SAFETY OPERATOR QUALIFICATIONS

a. A SO shall be a civil servant or an on-site contractor who has experience on the equipment or type of equipment to which RL/RT lockout may be performed. Evidence to support qualification as a SO shall be by one of the following:
   (1) Licensed as a Journeyman Tradesman in the Commonwealth of Virginia or other governmental jurisdiction with licensing requirements equivalent to the Commonwealth of Virginia. In addition to the Journeyman License, a SO shall have one year of relevant experience after the date of first licensing on equipment or type of equipment to which LOTO will be performed. The experience shall be acceptable to the Contract Manager for on-site contractor employees or the Organizational Unit Manager or his/her designee for civil servants and concurred with by the LaRC Safety Manager.
   (2) Completion of a United States Department of Labor apprenticeship as evidenced by a Certificate of Completion of Apprenticeship. In addition to the Certificate of Completion of Apprenticeship, a SO shall have one year of relevant experience after the date of completion of the apprenticeship on equipment or type of equipment to which LOTO will be performed. The experience shall be acceptable to the Contract Manager for on-site contractor employees or the Organizational Unit Manager or his/her designee for civil servants and concurred with by the LaRC Safety Manager.
   (3) Six years of relevant practical experience on the equipment or type of equipment to which LOTO will be performed. The experience shall be acceptable to the Contract Manager for on-site contractor employees or the Organizational Unit Manager or his/her designee for civil servants and concurred with by the LaRC Safety Manager.
   (4) Direct involvement in the development and construction or assembly of a particular research apparatus or facility with appropriate knowledge of the research apparatus or facility that would allow the individual to safely perform lockout/tagout on the particular research apparatus or facility. For contractors direct involvement shall be acceptable to the Contract Manager, or the Organizational Unit Manager or his/her designee for civil servants and concurred with by the LaRC Safety Manager.

(5) Demonstrated knowledge of the characteristics, operation, and hazards of the specific facility, system(s), or class of equipment for which the individual will be authorized to perform lockout/tagout. Supporting documentation shall be attached to the Safety Operator, LF 451. The supporting documentation shall conform with the candidate's:
   a) Ability to locate, read, and understand applicable schematic drawings (list drawing numbers).
   b) Ability to locate and identify key system components in the field (list specific components).
   c) Knowledge of the system or equipment operation (Qualifications as a level 1or level 2 certified to operator or a statement that the candidate has satisfactorily described the operation to his supervisor and the associated FSH).
   d) Ability to safely start-up and shutdown systems or equipment (list of SOP's demonstrated or equipment operated).
   e) Ability to identify hazards associated with the facility, systems, or class of equipment (list of the systems or class of equipment and hazards identified by candidate).

(6) The supporting evidence shall be documented on LF 451 and signed by the candidate's supervisor and associated FSH to confirm that the candidate has demonstrated the listed knowledge and abilities. The documented evidence of the candidate's knowledge and ability shall be acceptable to the Contract Manager for contract employees or the organizational unit manager or his/her designee for civil servants and concurred with by the LaRC Safety Manager.

Chapter 5

5. AUTHORIZATION PROCESS AND QUALIFICATIONS FOR A SAFETY OPERATOR FIELD VERIFIER (FIELD VERIFER)

5.1 DOCUMENTATION

5.1.1 The document associated with the authorization of a Field Verifier is:

a. LF 519, “Safety Operator Field Verifier Appointment Form."

5.2 FIELD VERIFIER AUTHORIZATION PROCESS

a. The procedure for certification as a Safety Operator Field Verifier:
   (1) An employee’s supervisor shall initiate a LF 519, "Safety Operator Field Verifier Appointment Form."
   (2) Both the LaRC Safety Manager and the appropriate Standard Practice Engineer shall concur that the employee’s qualifications are acceptable if they believe that to be the case. If they do not believe the employee’s qualifications are acceptable, they shall nonconcur.
   (3) Recommendations shall be presented to the LaRC Executive Safety Council for appointment.
   (4) The LaRC Safety Manager shall maintain on file the approved LF 519 along with the minutes from the Executive Safety Council meeting.

5.3 FIELD VERIFIER QUALIFICATIONS

a. A Safety Operator Field Verifier shall be a technical subject matter expert in the field in which the Safety Operator Candidates are to be certified. A Safety Operator Field Verifier shall be or have been a NASA Safety Operator. Evidence to support qualification as a technical subject matter expert shall be by one of the following:
   (1) Licensed as a Master Tradesman in the Commonwealth of Virginia or other governmental jurisdiction with licensing requirements equivalent to the Commonwealth of Virginia. In addition to the license as a Master Tradesman in the Commonwealth of Virginia, the Safety Operator Field Verifier shall have 2 years of relevant experience after the date of first licensing on equipment or type of equipment to which SO candidates will be certified to perform RL/RT lockout. The experience shall be acceptable for the employees Contract Manager for support to the Organizational Unit Manager or his/her designee for civil servants and concurred with by the LaRC Safety Manager.

(2) Completion of a United States Department of Labor apprenticeship as evidenced by a Certificate of Completion of Apprenticeship. In addition to the Certificate of Completion of Apprenticeship, the Safety Operator Field Verifier shall have 3 years of relevant experience after completion of the apprenticeship on equipment for the type of equipment on which SO candidates will be certified to perform RL/RT lockout. The experience shall be acceptable to the Contract Manager for contractor employee or to the Organizational Unit Manager or his/her designee for a civil servant and concurred with by the LaRC Safety Manager.

(3) Ten years of relevant experience acceptable to the Contract Manager for a contractor employees or to the Organizational Unit Manager or his/her designee for a civil servant on the equipment or type of equipment to which SO candidates will be certified to perform RL/RT lockout.

(4) Ten years of a combination of education (30 college credits substituted for one year of relevant experience) and relevant experience on the equipment or type of equipment to which SO candidates will be certified to perform Lockout/Tagout that is acceptable to the Contract Manager for a contractor employee or to the Organizational Unit Manager or his/her designee for a civil servant. The LaRC Safety Manager shall concur with the experience.

5.4 FIELD VERIFIER RESPONSIBILITIES

5.4.1 The Field Verifier shall:

a. Verify that the recommended employee seeking authorization as a SO has a working knowledge of system(s), the energy sources and hazards of those systems and the controls required for effective lockout.

b. Verify that the recommended employee understands requirements of this LPR.

c. Ensure the SO understands that their safety and the safety of the PE’s depend on their ability to lockout a system safely and they have the authority and responsibility to refuse to lockout a system if they feel they are not qualified to do so or for any reason they think their safety or the PE’s safety will be compromised.

Appendix A

DEFINITIONS

Capable of Being Locked-Out - An energy isolating device is capable of being locked - out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked-out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy control capability.

Energized - Connected to an energy source or containing residual or stored energy.

Energy Isolating Device - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from an ungrounded supply conductor, and in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy Source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Group Lockout - A group lockout occurs when maintenance, repair or service is performed by an employee(s) other than the employee(s) that locked-out the machine or system.

Industrial Facility –Includes but is not limited to facilities that generate energy, their energy distribution system/network and operational facilities that consume large quantities of energy. Facilities such as the Steam Plant and the Compressor Station generate energy for Center consumption. Examples of distribution systems include substations and electrical distribution lines for electrical energy and piping, fittings flanges valves and pumps for distributing steam and air throughout the Center. The National Transonic Facility, Unitary Plan Wind Tunnel, Transonic Dynamics Tunnel, the Aircraft Landing Dynamics Facility and the Hangar are some examples of facilities that consume large quantities of energy.

Lockout - The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device - A device that utilizes a positive means such as a lock to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Protected Employee - An employee whose duties include servicing or maintenance of machines, equipment of systems that are under a LOTO condition. This is equivalent to an **Authorized** employee as defined by, 29 CFR 1910.147 (b).

Responsible Employee – An authorized employee that accepts primary responsibility for a set number of employees working under the protection of a group lockout.

Safety or Shop Machine Operator or Authorized Employee A person who locks out or tags out machines, equipment or systems in order to perform servicing or maintenance on that machine or equipment.

Servicing and/or Maintenance - Workplace activities, such as constructing, installing, setting up, adjusting, inspecting, modifying, maintaining and/or servicing machines, equipment or systems. These activities include lubrication, cleaning or unjamming of machines, equipment or systems and making adjustments or tool changes, where the employee may be exposed to the **unexpected** energization or startup of the equipment or release of hazardous energy.

Setting Up - Any work performed to prepare a machine or equipment to perform its normal production operation.

Tagout - The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout Device - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.